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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,407	03/26/2004	Katsumi Inukai	119263	7578

25944 7590 08/07/2006

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EXAMINER	
ROTH, LAURA K	
ART UNIT	**PAPER NUMBER**
2852	

DATE MAILED: 08/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/809,407	INUKAI, KATSUMI	
	Examiner	Art Unit	
	Laura K. Roth	2852	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,4,6,7,10,12,13 and 15-23 is/are rejected.

7)☒ Claim(s) 2,3,5,8,9,11 and 14 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08 June 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Drawings

The drawings were received on 8 June 2006. These drawings are accepted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 6-7, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038).

Regarding claim 1, Cao et al. (US 6,111,230) teach a heating apparatus comprising: a heat unit that generates heat in response to energization (fig.1, #64); and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an on and off period defined by sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value

of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0).

Regarding claim 4, Cao et al. (US 6,111,230) teach a heating apparatus wherein the energization unit sets the off time of the control signal to a time not matching the time of an integral multiple of a half the period of the AC power supply (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3: 10.3 msec is not an integer multiple of the half period).

Regarding claim 6, Cao et al. (US 6,111,230) teach a heating apparatus wherein the energization unit prolongs the on time of the control signal with the passage of time from the energization start time (fig.4, second delay is shorter therefor the on time of the heater is longer).

Regarding claim 7, Cao et al. (US 6,111,230) teach a heating apparatus comprising: a heat unit that generates heat in response to energization (fig.1, #64); and an energization unit that supplies AC power to the heat unit (fig.1) and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal (fig.4, #150 and #170: the signal is on then off) and detects a voltage value of the AC power crossing zero (fig.1, #50) and switches on and off the control signal based on the detection result (fig.4, pulses on #150 switch off when zero crossing is detected on #120 and switch on after a counted time delay started at a zero crossing signal #162); and wherein the energization unit is configured stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0).

Regarding claim 16, Cao et al. (US 6,111,230) teach a heating apparatus further comprising a CPU turning on and off the control signal (fig.1, #30).

Regarding claim 17, Cao et al. (US 6,111,230) teach a heating apparatus further comprising a CPU turning on and off the control signal (fig.1, #30).

Regarding claim 18, Cao et al. (US 6,111,230) teach an image formation apparatus (col.4, ln.10-22), comprising: a heat unit that generates heat in response to energization (fig.1, #64) to heat a toner image formed on a recording medium for fixing the toner image on the recording medium; and an energization unit (fig.1) that supplies AC power (fig.1, #54) to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues) and sets an on and off period defined by sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half the period of the AC power (col.10, ln.27-45; col.10, ln.61 to col.11, ln.3); and wherein the energization unit is configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0).

Regarding claim 19, Cao et al. (US 6,111,230) teach an image formation apparatus (col.4, ln.10-22), comprising: a heat unit (fig.1, #64) that generates heat in response to energization to heat a toner image formed on a recording medium for fixing the toner image on the recording medium; and an energization unit (fig.1) that supplies

AC power to the heat unit and energizes the heat unit discontinuously in a pulsatile manner at least when energization of the heat unit is started (fig.4, #170); wherein the energization unit turns on and off a control signal (fig.4, #150 and #170: the signal is on then off) and detects a voltage value of the AC power crossing zero (fig.1, #50) and switches on and off the control signal based on the detection result (fig.4, pulses on #150 switch off when zero crossing is detected on #120 and switch on after a counted time delay started at a zero crossing signal #162); and wherein an energization control unit configured to stop energizing the heat unit when the control signal is off and when the voltage value of the AC power crosses zero (fig.4, #174 & #176: current reaches 0 when #150 is off and #100 crosses 0).

However, Cao et al. (US 6,111,230) fail to teach an energization unit configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero.

Regarding claim 1, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

Regarding claim 7, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

Regarding claim 18, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

Regarding claim 19, Kishimoto (US 5,669,038) teaches a heating apparatus wherein an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero (col.2, ln.25-28).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the heating apparatus of Cao et al. (US 6,111,230) by configuring it to turn on when the ON signal and a zero crossing point coincide as in Kishimoto (US 5,669,038) to provide a system with a low rush current when the heater current is activated, preventing unnecessary flicker (col.2, ln.22-ln.40) and to avoid detrimental harmonic current and contact noise that arises from beginning the heater at a point mid-wave as disclosed by Nishida (US Pub. 2003/0072581) (para.0007).

Claims 10,12, 13, 15, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038) as applied to claims 1 and 7 above, and further in view of Mine (US 6,157,010).

Regarding claims 10 and 13, Cao et al. (US 6,111,230) teach an integrated control unit (fig.1, #30).

Regarding claims 20 and 21, Cao et al. (US 6,111,230) teach wherein the integrated control unit controls the energization unit so as to turn on and off the control signals twice or more (fig.4, #150 and #170: the signal is on then off more than twice as two instances are shown and dots indicated the pattern continues).

However, neither Cao et al. (US 6,111,230) nor Kishimoto (US 5,669,038) teach a plurality of heat units, a plurality of energization units or controls therefor.

Regarding claim 10, Mine (US 6,157,010) teaches a heating apparatus comprising: an integrated control unit (fig.7, 12); wherein the heat unit includes a plurality of heat units each provided with the energization unit (fig.7, #3a and #3b); the energization unit includes a plurality of energization units (fig.7, #11a and #11b) and the integrated control unit controls the plurality of energization units so that discontinuing the on state results in the control signals generated by the plurality of energization units being superposed in a pulsatile current (see fig.10B with respect to fig.10E).

Regarding claim 12, Mine (US 6,157,010) teaches a heating apparatus wherein the integrated control unit further controls the plurality of energization units so as to turn on and off the control signals in order (see fig.10B with respect to fig.10E).

Regarding claim 13, Mine (US 6,157,010) teaches a heating apparatus comprising: an integrated control unit (fig.7, 12); wherein the heat unit includes a plurality of heat units each provided with the energization unit (fig.7, #3a and #3b); the energization unit includes a plurality of energization units (fig.7, #11a and #11b) and the integrated control unit controls the plurality of energization units so that discontinuing the on state results in the control signals generated by the plurality of energization units being superposed in a pulsatile current (see fig.10B with respect to fig.10E).

Regarding claim 15, Mine (US 6,157,010) teaches a heating apparatus wherein the integrated control unit further controls the plurality of energization units so as to turn on and off the control signals in order (see fig.10B with respect to fig.10E).

Regarding claims 22 and 23, Mine (US 6,157,010) teaches a heating apparatus wherein the integrated control unit controls the plurality of energization units so as to

turn and off, during a time from off timing of either one of control signals to on timing of the control signal, each one of the other control signals once (fig.10B and fig.10E: ton2 ends at the end of the period toff1).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify the apparatus of Cao et al. (US 6,111,230) in view of Kishimoto (US 5,669,038) by including a plurality of heaters and energization units and incorporating sequenced controls therefor as seen in Mine (US 6,157,010) in order to be able to uniformly heat an entire roller in order to handle papers of a wide range of sizes (col.10, ln.21-25) and to still achieve the benefits derived from the pulse controls of Cao et al. (US 6,111,230).

Allowable Subject Matter

Claims 2, 3, 5, 8, 9, 11, and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

- Prior art does not disclose or suggest the claimed "on time... not matching the time of an integral multiple or a half the period" in combination with the remaining claim elements as set forth in claims 2 and 3.

- Prior art does not disclose or suggest the claimed "sets the off time of the control signal to a time one to six times the time of a half the period" in combination with the remaining claim elements as set forth in claim 5.
- Prior art does not disclose or suggest the claimed "determines whether to switch on/off the control signal on the basis of the counted number" in combination with the remaining claim elements as set forth in claims 8 and 9.
- Prior art does not disclose or suggest the claimed matching of periods and phases in combination with the remaining claim elements as set forth in claims 11 and 14.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Response to Arguments

Applicant's arguments filed 8 June 2006 have been fully considered but they are not persuasive.

The applicant's first argument revolves around the limitation of claims 1 and 18 involving setting of an on and an off period (said period defined by a time on added to a time off) such that it is a period not matching an integral multiple of a half period of the AC power. The Office would like to direct applicant's attention once more to cited lines (col.10, ln.27-45; col.10, ln.61 to col.11, ln.43), specifically column 11, of Cao et al. (US 6,111,230) [henceforth known as *Cao*] and fig.4, #150: the first off period is 121 "clicks" (a click is defined as 68.69 mseconds), the second off period is 113 "clicks" which come out to 8.31149 mseconds and 7.76197 mseconds, respectively. The on period, according to col.11, ln.43, is 1 msec. When the on time is summed with either of the off times, one arrives at a value of 9.31149 msec and 8.76197 msec, respectively. The frequency referenced in the scenario of fig.4, is 60Hz, which has a period of $16^2/_3$ msec and a half period is $8^1/_3$ msec. When one determines what the summed time is as a multiple of the half period, the two values arrived at are 1.1173788 and 1.0514364, respectively. Neither of these are an integer multiple of the half period. Additionally, the applicant's argument that *Cao* achieves this by using counts instead of initiating the applicant's means of setting is spurious because the claims recite no limitations that the on/off period must be set by the applicant's means, and because the fact that energization does not occur when the ON signal is present *and* a zero-crossing occurs is a deficiency remedied by the additional references cited.

In response to applicant's argument that the references do not teach "energizing the heat unit when a control signal is on and when a voltage value of an AC power crosses zero," the office concedes that *Cao* does not teach this limitation. This limitation was cited as the deficiency in *Cao* that was to be remedied by the other applied references. The secondary references Kishimoto (US 5,669,038) and Nishida (US Pub. 2003/0072581) [henceforth known as *Kishimoto* and *Nishida*, respectively] do not so much teach structure, as the applicant argues that the applicant's specification teaches the problems with a system such as *Kishimoto*. *Kishimoto* strictly teaches that it was known in the art at the time of invention to energize a heating element based on a zero-crossing point. *Nishida* provides evidence that it was known in the art at the time of invention that energizing a heating element in the middle of a half-wave instead of at a zero-crossing point creates undesirable harmonic current and contact noise. Thus, the references cited give a means and a reasoning to make the combination to solve a deficiency.

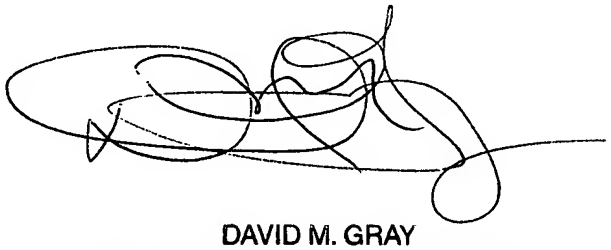
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura K. Roth whose telephone number is (571)272-2154. The examiner can normally be reached on Monday-Friday, 7:30 am to 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David M. Gray can be reached on (571)272-2119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LKR
8/2/2006



DAVID M. GRAY
SUPERVISORY PATENT EXAMINER

Amendments to the Drawings:

The attached replacement drawing sheet makes changes to Fig. 2 and replaces the original sheet with Fig. 2.

Attachment: Replacement Sheet

Accepted
8/24/06